WHAT IS CLAIMED IS:

1. A substrate-coating system, comprising:

- a substrate holder for holding at least one substrate at a coating position for coating the substrate on a coating side, and

- a substrate heater,

wherein the substrate heater comprises a backside heater for actively heating the substrate from a backside opposite the coating side thereof, while the substrate is at the coating position.

2. A substrate coating system according to claim 1, configured for coating CaF_2-substrates.

3. A substrate-coating system according to claim 1, wherein the substrate heater further comprises a front-side heater.

4. A substrate-coating system according to claim 1, wherein:

- the substrate holder comprises at least one substrate carrier that is transparent to the thermal radiation emitted by the backside heater over at least portions thereof, and

- the backside heater has at least one heating element arranged on that side of the substrate holder opposite the substrate to be coated.

5. A substrate-coating system according to claim 4, wherein every heating element is an IR thermal radiator, and at least one window area that is at least partially transparent to the thermal radiation emitted by the IR thermal radiator and incorporates a window layer of at least one of a Ge-material, ZnSe-material, ZnS-material or Si-material, is incorporated into the associated substrate carrier.

6. A substrate-coating system according to claim 5, wherein the window layer is anti-reflection coated for an IR wavelength range below 20 μm on at least one side thereof.

7. A substrate-coating system according to claim 6, wherein the window layer is anti-reflection coated for an IR wavelength range from approximately 10 μm to approximately 12 μm.

8. A substrate-coating system according to claim 1, further comprising heat-transfer barriers which respectively enclose associated ones of the substrates as a hood during respective cooling-down periods.

9. A substrate-coating system according to claim 1, further comprising a planetary-drive system equipped with a plurality of substrate carriers arranged around an axis, and wherein the backside heater comprises a closed heat-radiator ring.

10. A substrate-coating system according to claim 1, further comprising a planetary-drive system equipped with a plurality of substrate carriers arranged around an axis, and wherein the backside heater comprises an open heat-radiator ring.

11. A substrate-coating system according to claim 10, wherein the backside heater incorporates an open heat-radiator ring that has a pyrometer for detecting substrate temperature arranged within a ring gap of the radiator ring.

12. A substrate-coating system according to claim 1, further comprising heat-conducting elements that two-dimensionally abut against associated ones of the substrates.

13. A substrate-coating system according to claim 12, wherein the heat-conducting elements form part of the substrate holder.

14. A substrate-coating system according to claim 12, further comprising elements that elastically press the heat-conducting elements respectively against the substrates.

15. A method for heating, while being coated, at least one substrate inserted into a substrate-coating system, comprising:

- detecting the temperature of the substrate and of a heat-conducting element abutting against at least one of the substrate and a substrate-carrier fixture that is in thermal contact with the substrate;

- regulating the heating power of the substrate heater in accordance with a difference between the detected actual substrate temperature and a preset substrate temperature; and

- limiting that heating power such that the detected temperature of the heat-conducting element or substrate-carrier fixture does not exceed a maximum temperature.

16. The method according to claim 15, wherein the maximum temperature exceeds the detected substrate temperature by a preset difference.

17. A method for heating, while being coated, at least one substrate inserted into a substrate-coating system, the method comprising:

- detecting the temperature of the substrate and of a heat-conducting element abutting against at least one of the substrate and a substrate-carrier fixture that is in thermal contact with the substrate; and

- at least one of regulating and limiting the heating power of the substrate heater in accordance with a difference between the actual substrate temperature and a selected value of an offset of the substrate temperature with respect to the temperature of the heat-conducting element or the substrate-carrier fixture.